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THE AMERICAN JAGUARS.

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The jaguars of South America are readily distinguishable from the forms to the northward by cranial and dental characters, as shown beyond.

The materials from South America in the collection of the United States National Museum, including those of the Biological Survey of the United States Department of Agriculture, aggregating ten skulls and one mounted specimen, are insufficient for elucidating the southern forms which, collectively, represent the '*Felis onca* Linnæus' of modern authors. Considerable variation is observed in the skulls of eight males from Brazil, Paraguay, Bolivia, and Parana. The largest of these (No. 4128, U. S. National Museum) is from Paraguay, and measures 242 mm. in basilar length (Hensel). The audital bullæ are much flattened, with the space between them and the mastoid and paroccipital processes completely filled. The teeth give the following measurements: crown of upper carnassial, 29 by 15.6 mm.; crown of middle upper premolar, 20.3 by 11; length of upper canine, from gums, 43; length of incisor series, measured on alveoli, 35. Compared with the above specimen, the skull of No. 4361, also collected by Captain T. J. Page, U. S. N., at San Jose, Parana, measures only 212 mm. in basilar length, but has relatively heavy dentition, the

crown of upper carnassial measuring 31 by 16; crown of middle upper premolar, 20 by 13; length of upper canine from gums (tooth worn), 37; length of incisor toothrow, 33.5. The audital bullæ are greatly flattened, the space between bulla and paroccipital filled, but that between it and mastoid not completely so. Brazilian skulls are somewhat smaller than those from Parana, Paraguay, and Bolivia, and have smaller teeth, less flattened audital bullæ; and in some there is a sulcus between the bulla and the mastoid process.

The jaguars of South America may be distinguished from those of Central America and Mexico as follows:

*South American Jaguars.*

Postpalatal fossa, in adult male, more than 23 mm. wide.

Audital bulla flattened, with space between it and paroccipital and mastoid processes filled up.

Length of second and third premolars, taken together, more than 45 mm.

Maximum diameters of male skull, 300 by 200 mm.

*Mexican and Central American Jaguars.*

Postpalatal fossa less than 23 mm. wide.

Audital bulla inflated, with deep fossæ between it and the mastoid and paroccipital processes.

Length of second and third premolars, taken together, less than 45 mm.

Maximum diameters of male skull, 280 by 180 mm.

The remaining forms, from north of South America, of which I have examined six skins and thirteen skulls, may be identified by means of the following key:

Skin with a rosette pattern, in black, extending from neck to hips and from vertebral line to belly. Outer surface of ear, all black. Skull of male less than 215 mm. in basal length. Inhabits Central America, from Honduras to Panama..... *Felis centralis.*

Skin with distinct rosettes only on middle dorsal area; elsewhere they are disorganized into isolated black spots. Outer surface of ear with a tawny central spot. Skull of male more than 215 mm. in basal length. Distributed throughout the lowlands of Mexico and the adjacent border of the United States.

- Coloration pallid, ground color ochraceous buff, black spots small. Inhabits the Arid Tropical areas of Mexico, north to the United States.....*Felis hernandesii*.
- Coloration intense, ground color tawny ochraceous, black markings much larger. Inhabits Humid Tropical areas of Mexico, (north to Texas ?) .....
- .....*Felis hernandesii goldmani*.

**Felis centralis** sp. nov.

CENTRAL AMERICAN JAGUAR.

*Type*.—Skull No. 14,177, adult male, from Talamanca, Costa Rica, collected by Professor William M. Gabb. (The skin, No. 12,177, U. S. National Museum, seems to have been destroyed.)

*Characters*.—Smallest of the Jaguars. Length of adult male, 1800 mm. Basal length of male skull, 200 to 212. Dentition weak, upper premolar series measuring, on alveoli, 49 to 53.5. Coloration intense; upper surface of body with a median chain of black spots, bordered by five rows of black-bordered rosettes, on a ground of clay color; outer surface of ear, black, excepting a few tawny hairs; chest and belly heavily blotched with black.

*Color*.—Skin No. 61,192, U. S. National Museum collection, from Costa Rica, received from the Costa Rican Commission, World's Columbian Exposition, has the upperparts with a median chain of black spots, bordered on each side by about five longitudinal rows of black rosettes occupying the back and sides, on a ground of clay color. The median dorsal area consists of a chain of confused double spots tending to coalesce anteriorly and appearing as distinct, oval, paired blotches posteriorly. The lateral rows of rosettes, which vary from 50 to 100 millimeters in diameter, increase in size from the vertebral line to the belly, enclosing light areas of correspondingly increasing size, clay color slightly tinged with tawny, and containing from one to five small, rounded, black spots. The upper side of neck, and crown, have the ground color slightly suffused with tawny, the former having a modification of the rosette pattern of the black spotting of the back, the latter being rather uniformly covered with rounded black spots, from five to fifteen millimeters in diameter, smallest anteriorly, extending from opposite the anterior border of the eyes to opposite the posterior border of the ears. Muzzle, clay color, finely and evenly sprinkled with black hairs, leaving a plain, pale buffy crescent bordering the median upper margin of the nasal pad. A large black spot borders the upper, and another the lower lip. Ears, solid black on outer surface, excepting a few tawny hairs in middle; inner surface clay color, edged with tawny on anterior margin. Bristles of upper lips and above eyes, mixed black and white. Eyelashes and a few long hairs on sides of base of nose, black. Outer surface of limbs, clay color, coarsely blotched with black, the spots decreasing in size and becoming more rounded from the body

to the toes, those of the arms and thighs measuring 30 to 60 millimeters in diameter. Claws, horn color. Tail spotted and banded with black, the intervening areas being clay color or somewhat hoary nearest the tip, which is broadly black. The upper side of tail has more black than light, the under side having the black and clay-colored areas about equal in amount. In the median line, above, each light ring has a black spot, and the last pale rings are mixed with black hairs. There are three subterminal bands of solid black above, the more proximal ones being interrupted. On the under side of tail the pattern is confused and the light areas whitish. Underparts buffy white, heavily blotched with black. Under side of body with a median chain of small black spots, and two rows of somewhat quadrate black blotches on either side, the spots averaging about fifty millimeters in diameter. On the under side of neck and head, the black spots, which are much smaller than those on the chest and abdomen, tend to form transverse chains, while those of the cheeks and muzzle are arranged in longitudinal series.

The flat skin of a jaguar taken about 100 miles up the Segovia River, which forms the boundary between Nicaragua and Honduras, killed by Mr. Charles H. Townsend of the United States Fish Commission, closely resembles the specimen from Costa Rica just described, differing in being slightly more intense in coloring, the vertebral spots coalescing so that an interrupted median dorsal stripe is formed; and some spots in the lateral rows are filled with black, others having the rosettes elongated and resembling the outline of the animal's hind foot, small black spots suggesting the pads or tubercles. In general, the two may be considered to be identical.

*Skull and teeth.*—Skull high, narrow interorbitally, with small, pointed audital bullæ. Dentition weaker than in the remaining forms (see measurements).

*Measurements.*—Following are measurements taken from the skin of an adult male, No. 61,192, U. S. National Museum Collection: length, 1800 mm.; tail, 575; hind foot, 220; ear from crown, 60; chord of longest hind claw, 23; fore claw, 26. The flat skin described above, from Honduras, has the end of the tail gone: its head and body measure 1475 mm. in length. Measurements of skulls of two adult males (Nos. 14,177 and 14,176, both from Talamanca, Costa Rica, collected by Professor W. M. Gabb): basilar length, 200, 212; zygomatic breadth, 169, 175; mastoid breadth, 102, 105; distance between orbits, 42.5, 45; between tips of post-orbital processes, 68, 70.5; postorbital constriction, 41.5, 43; length of nasals, on median line, 59, 66; greatest breadth of nasals, 38, 43; distance from foramen magnum to hinder margin of palate, 103, 108; from posterior margin of palate to middle incisor tooth, 98, 106; length of interpterygoid fossa from base of hamular process, 33, 37; distance between upper carnassials, 52.5; 56; distance between upper canines, 32, 36.5; greatest length of mandible, 167, 180; greatest height of mandible, 81, 84; length of upper incisor series, measured on alveoli, 29, 32; distance across upper canines, measured on alveoli, outside, 65, 69; length of upper lateral tooththrow, 75, 82.5; length of upper premolar

series, measured on alveoli, 49, 53.5; crown of upper carnassial tooth, 25.3 by 13.7. 26.5 by 13.9; crown of middle upper premolar, 17.5 by 9, 18 by 9.

### **Felis hernandesii** (Gray).

#### MAZATLAN JAGUAR.

*Leopardus hernandesii* Gray, Proc. Zool. Soc. London, 1857, p. 278, Mamm. pl. LVIII (colored). Type from Mazatlan, State of Sinaloa, Mexico.

*Felis onca* Alston, Biologia Centrali-Americana, Mammalia, 1879-'82, p. 58. (Part.)

*Characters*.—Size larger than *Felis centralis*, smaller than *F. onca*. Coloration pale, with black markings greatly reduced in size, on a ground color of ochraceous buff, the black-bordered rosettes being confined to the upper portion of the middle dorsal region and elsewhere broken up into isolated spots.

*Color*.—Ground color ochraceous buff. The pattern of the black markings is quite different from *Felis onca* and *F. centralis*, as pointed out by Doctor J. E. Gray (P. Z. S., 1857, p. 278) and shown in his excellent colored figure, taken from the living animal. He states that "instead of the spots being all placed in rings or roses, as they are usually called, the spots on the front part of the body are single and scattered, and those on the hinder part of the body are alone placed in rings or roses." Later (P. Z. S., April 11, 1867, p. 402), Gray continues: "The specimen which I described under the name of *Leopardus hernandesii* \* \* \* has come into the British Museum collection; and I cannot find any difference in the skull to distinguish it from the other specimens of the Jaguar; so I suppose it must be considered one of the varieties of that species, marked by the distance at which the small spots are placed from each other, only now and then forming anything like a distinct ring or row of spots." The skin described below, lent me by Doctor A. K. Fisher, is essentially a topotype, collected at Cacalotlan (near Mazatlan), in the State of Sinaloa, Mexico, by Mr. Edward W. Nelson. In this specimen, the chain of black markings along the vertebral line is disorganized anteriorly, and consists of paired round or elliptical spots, more or less fused and irregular on the posterior half of body, and traceable to the middle of the tail as a dorsal series of narrowly-elongate, black spots: it appears as a narrow, interrupted line on the crown and neck. The rosettes are restricted to the region behind the shoulders, and, even there, are mostly broken up into scattered spots; and they do not tend to completely encircle light areas, which latter seldom contain black spots. The rosettes become vague after the first two or three rows, disappearing in a succession of scattered spots upon the sides so that it is impossible to count the number of rows, as is easily done in *Felis onca* and *F. centralis*, though the number of rows suggested by the scattered spots is obviously greater than in those

species. The black spotting extends over the outer surface of the limbs. The whole top and sides of the head, excepting the muzzle above, are quite evenly covered with rounded black spots, measuring 5 to 10 mm. in diameter, those on sides of muzzle forming longitudinal rows; upper side of muzzle ochraceous buff finely mixed with black hairs. Ears clothed inside with buffy-white hairs; outer surface black, with a large tawny spot occupying the middle portion. Tail ochraceous buff above, grayish white below, longitudinally striped with black on proximal three-fifths, and transversely banded with black on terminal two-fifths, the last three or four light rings being grayish. Underparts buffy white, rather lightly banded with elongate (not quadrate) black spots.

*Skull and teeth.*—The collection of the United States National Museum contains but two skulls of *Felis hernandesii hernandesii*, both females of which measurements are given below.

*Measurements.*—The flat skin described above is 1990 mm. in total length; tail, 650. Measurements of two skulls of adult females (No. 6480, U. S. National Museum, from near Colima, Mexico, and No. 88,044, U. S. Nat. Mus., Biological Survey Collection, from San Blas, Mexico): basilar length, 181, —; zygomatic breadth, 156, 159; mastoid breadth, 95, —; interorbital breadth, 45, 46; distance between tips of postorbital processes, 72, 70; postorbital breadth, 45, 50; length of nasals on median line, 53, 55; greatest breadth of nasals, 36, 37; from foramen magnum to hinder margin of palate, 90, —; from posterior margin of palate to middle incisor tooth, 91, 87; length of postnarial fossa from base of hamular process, 26, 28; distance between upper carnassials, 53, 54; distance between upper canines, 31, 34; greatest length of mandible, 150, 154; greatest height of mandible, 67, 72; length of upper incisor toothrow, measured on alveoli, 29.5, 28.5; distance across upper canines, 63, 61; length of upper lateral toothrow, 71, 72; length of premolar series, measured on alveoli, 49, 48; crown of upper carnassial, 25.8 by 13, 24 by 13; crown of middle upper premolar, 16.2 by 8.4, 16.2 by 8.2.

***Felis hernandesii goldmani* subsp. nov.**

CAMPECHE JAGUAR.

*Type.*—Skin No. 105,930, U. S. National Museum Collection, taken at Yohatlan, Campeche, Mexico, January 5, 1901, by Mr. Edward A. Goldman of the Biological Survey, United States Department of Agriculture.

*Characters.*—Pattern of coloration as in typical *Felis hernandesii*, but color much more intense; black markings greatly increased in size; ground color tawny ochraceous; tail largely black above.

*Color.*—Upperparts tawny ochraceous, heavily spotted with black. In the type specimen, the dark vertebral area is composed of a chain or double row of black spots, separate and elongate on the neck, rounded and more or less joined together opposite shoulders and on rump, and forming a practically complete dorsal stripe on middle of back. The rosettes, which are almost confined to the middle dorsal area, do not

tend to completely encircle light areas, and, together with the other black markings, are disposed as in *F. hernandesii*, but are very much increased in size. There is no light spot at the upper margin of the nasal pad. Ears whitish cream-buff within, black without, edged anteriorly with tawny, and with a large tawny spot on middle of black external surface. Tail irregularly spotted and banded with black, which color greatly predominates. At base of tail, the light areas are tawny above and white or grizzled below; terminal four or five light rings, hoary grayish, becoming successively narrower until obsolete towards the tip, which is all black. Underparts buffy white, heavily banded with elongate (not quadrate) black spots.

*Skull and teeth.*—Decidedly larger than *Felis centralis*, the largest skull equalling the smallest adult male of *Felis onca* from South America. Teeth larger than those of *F. centralis*, smaller than in *F. onca*. The premolar teeth are narrower than in South American jaguars. The skull as a whole, aside from general size, is much more heavily ossified than in *Felis centralis*, in this respect being comparable with the South American *F. onca*, from which it is geographically separated by the range of *F. centralis*.

*Measurements.*—The skin of the type measures 1910 mm. in total length; tail, 670. Skulls of three adult males (Nos. 100,541, U. S. National Museum, Biological Survey Collection, from Palenque, State of Chiapas, Mexico; 9703, U. S. National Museum, from Tehuantepec, Mexico; 67,403, U. S. National Museum, Biological Survey Collection, from San Andres, State of Vera Cruz, Mexico) present the following dimensions: basilar length of Hensel, 211, 217, 227; zygomatic breadth, 178, 188, 180; mastoid breadth, 111, 112, 113; least interorbital breadth, 49, 51, 50; distance between tips of postorbital processes, 74, 81, 75; least postorbital breadth, 44, 47, 46; length of nasals on median line, 62, 67, 66; greatest breadth of nasals, 43, 46, 48; distance from foramen magnum to posterior border of palate, 109, 111, 115; from posterior border of palate to middle incisor tooth, 104, 109, 111; length of postpalatal fossa from base of hamular process, 35, 36, 36; distance between upper carnassial teeth, 60, 57, 58; between upper canines, 36, 36, 39; greatest length of mandible, 178, 179, 182; greatest height of mandible, 90, 93, 90; length of upper incisor toothrow, measured on alveoli, 32, 31, 33; distance across upper canines, 71, 69, 72; length of upper lateral toothrow, 78, 79, 82; length of premolar series, measured on alveoli, 52, 50, 54; crown of upper carnassial, 27 by 13, 25 by 14, 27 by 14; crown of middle upper premolar, 17.3 by 9.2, 17 by 10, 18 by 9.3.

*Remarks.*—In true *hernandesii*, from the arid region of Mazatlan, in the State of Sinaloa, not only is the ground color paler, but the light areas are increased in size at the expense of the black, giving a decided pallor. The pattern of the tail markings becomes evident in *hernandesii* through reduction of black, and appears as interrupted longitudinal stripes on basal three-fifths of tail; ground color buff at base, darkest above and whitish below, and the subterminal hoary bands more plainly marked than in *goldmani*.